

Soil Health & Nutrient Density

Soil health is defined as *the capacity of soil to function as a living ecosystem that sustains plants, animals, and people.*

The nutrient density of food can be quantified in terms of the number of nutrients per calorie—the ratio of nutritional value to energy intake.

Two primary ways that farming practices influence soil health

- *the physical loss of topsoil (erosion)*
- *loss of soil organic matter, soil structure, soil life (soil degradation)*

Tillage and chemical fertilizers affect soil health by reducing soil organic matter and the diversity and abundance of soil life - those changes can influence nutrient cycling, crop mineral uptake, and phytochemical production

Organic farming practices increase the abundance of soil life resulting to higher nutritional value of crops.

Specifically, microbial biomass carbon and nitrogen were 41 and 51% higher, on organic plots, as well as 32-74% more microbial enzyme activity.

2-year period organically grown wheat, corn, potatoes, apples, and pears averaged 60-125% more iron, zinc, calcium, phosphorus, magnesium, and potassium relative to conventionally grown counterparts.

Crops grown with farmyard manure or compost contained more protein, vitamin C, phosphorus, potassium, and calcium. Remarkably, spinach had 77% more iron

(D. R. Montgomery, A. Biklé, 2021)

Phytochemical production plays a key role to soil health and human health

- ✓ Differences in the phytochemical content of foods can prevent **inflammation** and **reduce the risk of chronic diseases**.
- ✓ Certain phytochemicals **boost human anti-inflammatory defenses** and make malignant cells vulnerable to immune-system attack.
- ✓ Medical researchers attribute the cancer-suppressing effects of consuming more fruits and vegetables to the **antioxidant and anti-inflammatory phytochemicals of foods**